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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/599,160	06/21/2000	Jizheng Xu	MS1-1554US	6937

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EXAMINER	
DIEP, NHON THANH	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 10/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/599,160	XU ET AL.	
	Examiner	Art Unit	
	Nhon T Diep	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2004* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30,36-46 and 54-82* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-7,10,14-19,22-25,28-30,36-38,41,54-61 and 66-82* is/are rejected.

7)☒ Claim(s) *8,9,11-13,20,21,26,27,39,40,42-44 and 62-65* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 June 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5, 7, 16, 36, 38, 46, 54, 60, 67, 78, 80 and 82 are rejected under 35 U.S.C. 102(b) as being anticipated by Tong et al (US 5,982,434).

Tong et al discloses an image signal coding method and device thereof comprising the same method comprising transforming frames in a video sequence using a wavelet transform and motion information between frames to produce multiple sub-bands of coefficients (fig. 1, motion information: el. 10; wavelet transform: el. 20) and col. 7, ln. 46-52); and coding the coefficients of each sub-band independently (col. 3, ln. 36-39 and col. 22, ln. 21-30) as specified in claims 1, 16, 36, 46, 54, 67, 78, 80 and 82; the coding produces multiple bitstreams, one for each sub-band, and further comprising forming a bitstream from the multiple bitstream (fig. 1, output of el. 6: one bitstream) as specified in claim 5; and the coding comprises coding the coefficients of each sub-band bit-plane by bit-plane using different coding primitives (fig. 1, el. Zero tree coder) as specified in claims 7, 38 and 60.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Li et al (US 6,233,357).

As applied to claims 1 and 54 above, it is noted that Tong et al does not particularly disclose the wavelet transform comprises a shape-adaptive discrete wavelet transform as specified in claims 2 and 55. Li et al teaches the using of a shape-adaptive discrete wavelet transform for encoding video signal (col. 1, ln. 66 – col. 2, ln. 24) and therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al by using a shape-adaptive discrete wavelet transform. Doing so would help to code arbitrarily type shaped object.

5. Claims 3-4 and 15, 17-18, 25, 30, 56-58, 68-69 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Pearlman et al (US 6,674,911).

As applied to claims 1 and 54 above, Tong et al further discloses the coding comprises coding the coefficients of each sub-band bit-plane by bit-plane using different coding primitives (fig. 1, el. Zero tree coder) as specified in claims 25 and 75; and a computer-readable medium comprising computer executable instruction that, when executed by one or more processors, perform the method as recited in claim 17 (col. 22, ln. 21-30) as specified in claim 30, however, it is noted that Tong et al does not particularly disclose the transforming comprises performing a temporal 1-D wavelet

transform along motion trajectories in a temporal direction; and performing a spatial wavelet transform on the frames of the temporal wavelet coefficients to produce multiple sub-bands of wavelet coefficients as specified in claims 3-4, 15, 17-18, 56-58 and 68-69. Pearlman et al teaches the using of 3-D temporal-spatial wavelet transform to encode video signal (col. 2, ln. 57-63 and col. 15, ln. 16-29). And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al by using the 3-D temporal-spatial wavelet transform to encode video signal. Doing so would help to exploit the spatial redundancy even in the high temporal frequency band due to the camera motion.

6. Claims 6, 37, 59 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Mekuria (US 6,142, 035).

As applied to claims 1, 36, 54 and 78 above, it is noted that Tong et al does not particularly disclose the coding comprises transposing selected sub-band as specified in claims 6, 37, 59 and 79. Mekuria et al teaches the using of transposition of selected sub-band (col. 5, ln. 51 – col. 6, ln. 12). And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al by using the transposition of sub-band as taught by Mekuria. Doing so would help to provide better time resolution for small values of alpha and better frequency resolution for large values of alpha.

7. Claims 10, 41, 77 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Zandi et al (US 6,222,941).

As applied to claims 1, 36, 68 and 78 above, it is noted that Tong et al does not particularly disclose the coding comprises assigning contexts to the coefficients of each sub-band based on number of significant neighboring samples as specified in claims 10, 41, 7 and 81. Zandi et al teaches the using of multiple embedded coding techniques, wherein coefficients at one significance level are coded with one encoding technique, while the remaining coefficients are coded with another techniques (col. 16, ln. 5-30). And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al by coding coefficients at one significance level are coded with one encoding technique, while the remaining coefficients are coded with another techniques as taught by Zandi et al. Doing so would help to provide better scalability.

8. Claims 14, 45, 61 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Li et al (US 6,567, 081).

As applied to claims 1, 36 and 54 above, it is noted that Tong et al does not particularly disclose the truncating of a number of bits in each bit plane according to rate-distortion curves as specified in claims 14, 45 and 66; and using the context based arithmetic coder to assign context to the coefficients of each sub-band based on different coding primitives as specified in claim 61. Li et al teaches the truncating of a number of bits in each bit plane according to rate-distortion curves (col. 15, ln. 15-26) and the using of the context based arithmetic coder (col. 14, ln. 10-28). And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al by using the truncating of a number of bits

in each bit plane according to rate-distortion curves and coding the coefficients by using the context based arithmetic coder as taught by Li et al. Doing so would help to obtain a desired bit rate at the output. Further more using the context based arithmetic coder would help to provide the best compression performance.

9. Claims 19 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Pearlman et al (US 6,674,911) and further in view of Li et al (US 6,233,357).

As applied to claims 17 and 68 above, it is noted that Tong et al and Pearlman et al does not particularly disclose the wavelet transform comprises a shape-adaptive discrete wavelet transform as specified in claims 19 and 70. Li et al teaches the using of a shape-adaptive discrete wavelet transform for encoding video signal (col. 1, ln. 66 – col. 2, ln. 24) and therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al and Pearlman et al by using a shape-adaptive discrete wavelet transform. Doing so would help to code arbitrarily type shaped object.

10. Claims 22 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Pearlman et al (US 6,674,911) and further in view of Mekuria (US 6,142, 035).

As applied to claims 17 and 68 above, it is noted that Tong et al and Pearlman et al does not particularly disclose the coding comprises transposing selected sub-band as specified in claims 22 and 72. Mekuria et al teaches the using of transposition of selected sub-band (col. 5, ln. 51 – col. 6, ln. 12). And therefore, it would have been

obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al and Pearlman et al by using the transposition of sub-band as taught by Mekuria. Doing so would help to provide better time resolution for small values of alpha and better frequency resolution for large values of alpha.

11. Claims 23-24 and 73-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Pearlman et al (US 6,674,911) and further in view of Li et al (US 6,567, 081).

As applied to claims 17 and 68 above, it is noted that Tong et al and Pearlman et al does not particularly disclose coding each bit plane according to rate-distortion optimization and truncating bit allocated to a bit plane at a point on a rate-distortion curve that approximate a convex hull as specified in claims 23-24 and 73-74. Li et al teaches the truncating of a number of bits in each bit plane according to rate-distortion curves and truncating bit allocated to a bit plane at a point on a rate-distortion curve that approximate a convex (col. 15, ln. 15-26, 55-58). And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al and Pearlman et al by using the truncating of a number of bits in each bit plane that approximate a convex hull and according to rate-distortion curves as taught by Li et al. Doing so would help to obtain a desired bit rate at the output.

12. Claims 28 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Pearlman et al (US 6,674,911) and further in view of Taubman (US 6,778,709).

As applied to claims 17 and 68 above, it is noted that Tong et al and Pearlman et al does not particularly disclose the constructing of a multi-layer bitstreams from the multiple bitstreams as specified in claims 28 and 76. Taubman teaches the constructing of a multi-layer bitstreams from the multiple bitstreams (figs. 8-9). And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al and Pearlman et al by using the constructing of a multi-layer bitstream from the multiple bitstreams as taught by Taubman. Doing so would help to provide better SNR scalability.

13. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al, in view of Pearlman et al (US 6,674,911) and further in view of Zandi et al (US 6,222,941).

As applied to claim 17 above, it is noted that Tong et al and Pearlman et al does not particularly disclose the coding comprises assigning contexts to the coefficients of each sub-band based on number of significant neighboring samples as specified in claim 29. Zandi et al teaches the using of multiple embedded coding techniques, wherein coefficients at one significance level are coded with one encoding technique, while the remaining coefficients are coded with another techniques (col. 16, ln. 5-30). And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Tong et al and Pearlman et al by coding coefficients at one significance level are coded with one encoding technique, while the remaining coefficients are coded with another techniques as taught by Zandi et al. Doing so would help to provide better scalability.

Allowable Subject Matter

14. Claims 8-9, 11-13, 20-21, 26-27, 39-40, 42-44, and 62-65 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Ogata (US 5,777,678) discloses a predictive sub-band video coding and decoding using motion compensation.

b. Piche et al (US 2004/0028138) discloses a three-dimensional wavelet based scalable video compression.

c. Fukuhara et al (US 2001/0024530) disclose a picture encoding method and apparatus.

e. Li et al (US 6,597,739) discloses a three-dimensional shape-adaptive wavelet transform for efficient object-based video coding

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhon T Diep whose telephone number is 703-305-4648. The examiner can normally be reached on m-f.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris S Kelley can be reached on 703 305-4856. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ND
30 Sept 2004

NHON DIEP
PRIMARY EXAMINER